

What is claimed:

1. An avian pancreatic polypeptide modified by substitution of at least one amino acid residue, said at least one residue being exposed on the alpha helix domain of the polypeptide when the polypeptide is in a tertiary form.
- 5 2. The modified polypeptide of claim 1, wherein at least six substituted residues are substituted.
- 10 3. The modified polypeptide of claim 1, wherein at least eight substituted residues are substituted.
4. The modified polypeptide of claim 1, wherein at least ten substituted residues are substituted.
- 15 5. The modified polypeptide of claim 1, wherein at least twelve substituted residues are substituted.
6. The modified polypeptide of claim 1, wherein said at least one substituted residues are selected from any site on a known protein through which interaction with another molecule occurs.
- 20 7. The modified polypeptide of claim 6 wherein the known protein is selected from the group consisting of GCN4, CEBP, Max, Myc and MyoD.
- 25 8. The modified polypeptide of claim 1, wherein the site is a binding site.
9. The modified polypeptide of claim 8 wherein the binding site is a DNA binding site.
- 30 10. The modified polypeptide of claim 9 wherein the DNA binding site is selected from the group consisting of the CRE half site, the CEBP site, the MyoD half site and the

Q50 engrailed variant site.

11. The modified polypeptide of claim 8 wherein the binding site is a protein binding site.

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Julie A > 12. The modified polypeptide of claim 6 wherein the known protein is selected from the group consisting of double minute two, Bcl-2, protein kinase A, Jun and Fos.

13. A modified avian pancreatic polypeptide of any of claims 1 through 12, 10 wherein the interaction between the known protein and another molecule is inhibited.

14. A phage-display library comprising a plurality of recombinant phage that express the modified avian pancreatic polypeptide of any of claims 1 through 12.

15 15. A phage-display library comprising a plurality of recombinant phage that express the modified avian pancreatic polypeptide of any of claims 1 through 12.

16. A phage-display library comprising a plurality of recombinant phage that express a protein scaffold modified by substitution of at least one amino acid residue, said 20 at least one residue being exposed on the polypeptide when the polypeptide is in a tertiary form.

17. The phage-display library of claim 16, wherein said protein scaffold comprises the avian pancreatic polypeptide.

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18. A phage selected from the library of claim 16 or 17.

Julie A > 19. An isolated polypeptide selected from the group consisting of:
(a) an isolated polypeptide comprising the amino acid sequence of SEQ ID NO: 8, 30 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 33, 34, 35, 36, 37, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 70, 71 or 72;
(b) an isolated polypeptide comprising a fragment of at least twelve (12) amino

acids of SEQ ID NO: 8, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 33, 34, 35, 36, 37, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 70, 71 or 72;

(c) an isolated polypeptide comprising the amino acid sequence of SEQ ID NO: 8, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 33, 34, 35, 36, 37, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 70, 71 or 72; comprising one or more conservative amino acid substitutions;

(d) an isolated polypeptide comprising the amino acid sequence of SEQ ID NO: 8, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 33, 34, 35, 36, 37, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 70, 71 or 72; comprising one or more naturally occurring amino acid sequence substitutions; and

(e) an isolated polypeptide with at least ninety-five (95) percent amino acid homology to SEQ ID NO: 8, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 33, 34, 35, 36, 37, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 70, 71 or 72.

20. A nucleic acid encoding any one of the polypeptides in claim 19.

21. A method of preparing a miniprotein that modulates the interaction between a known protein and another molecule, comprising the steps of:

(a) identifying at least one amino acid residue contributes to the binding between a known protein and another molecule; and

(b) modifying an avian pancreatic polypeptide by substitution of said at least one amino acid residue, such that it is exposed on the alpha helix domain of the polypeptide when the polypeptide is in a tertiary form.

22. A method of identifying a miniprotein that modulates the interaction between a known protein and another molecule, comprising the step of isolating at least one recombinant phage clone from the phage display library of claim 16 that displays a protein scaffold that modulates the association between a known protein and another molecule.